

A MAGNETIC TUNNEL JUNCTION SENSOR WITH NON-SHUNTING STABILIZATION

ABSTRACT OF THE DISCLOSURE

5 A magnetic tunnel junction (MTJ) sensor in which the free layer longitudinal
biasing elements are coupled, without insulation, to the free layer outside of the MTJ
stack to provide reliable non-shunting MTJ free layer stabilization without extremely thin
dielectric layers. In one embodiment, hard magnetic (HM) layers are disposed in contact
with the free layer outside of and separated from the MTJ stack active region by a thick
10 dielectric layer. In another embodiment, antiferromagnetic (AFM) bias layers are
disposed in contact with the free layer outside of and separated from the MTJ stack active
region by a thick dielectric layer. In other embodiments, nonconductive HM layers are
disposed either in contact with the free layer outside of the MTJ stack active region
and/or in abutting contact with the MTJ stack active region.

15